	settings	Description
HF spiking interval	1 Lots	The interval of HF Spiking for each lot(Spike)
HF spike timing	1(or2)	1：before spiking；2：after HF spiking
Number of HF spiking	4 Times	The stroke count of a measuring pump used for HF spiking

Fig.1a

	settings	Description
HF spiking interval	5 Lots	HF Spiking for every 5 lots
HF spiking timing	1(or2)	1：before spiking；2：after HF spiking
Number of HF spiking	3 Times	The stroke count of a measuring pump used for HF spiking

Fig.1b

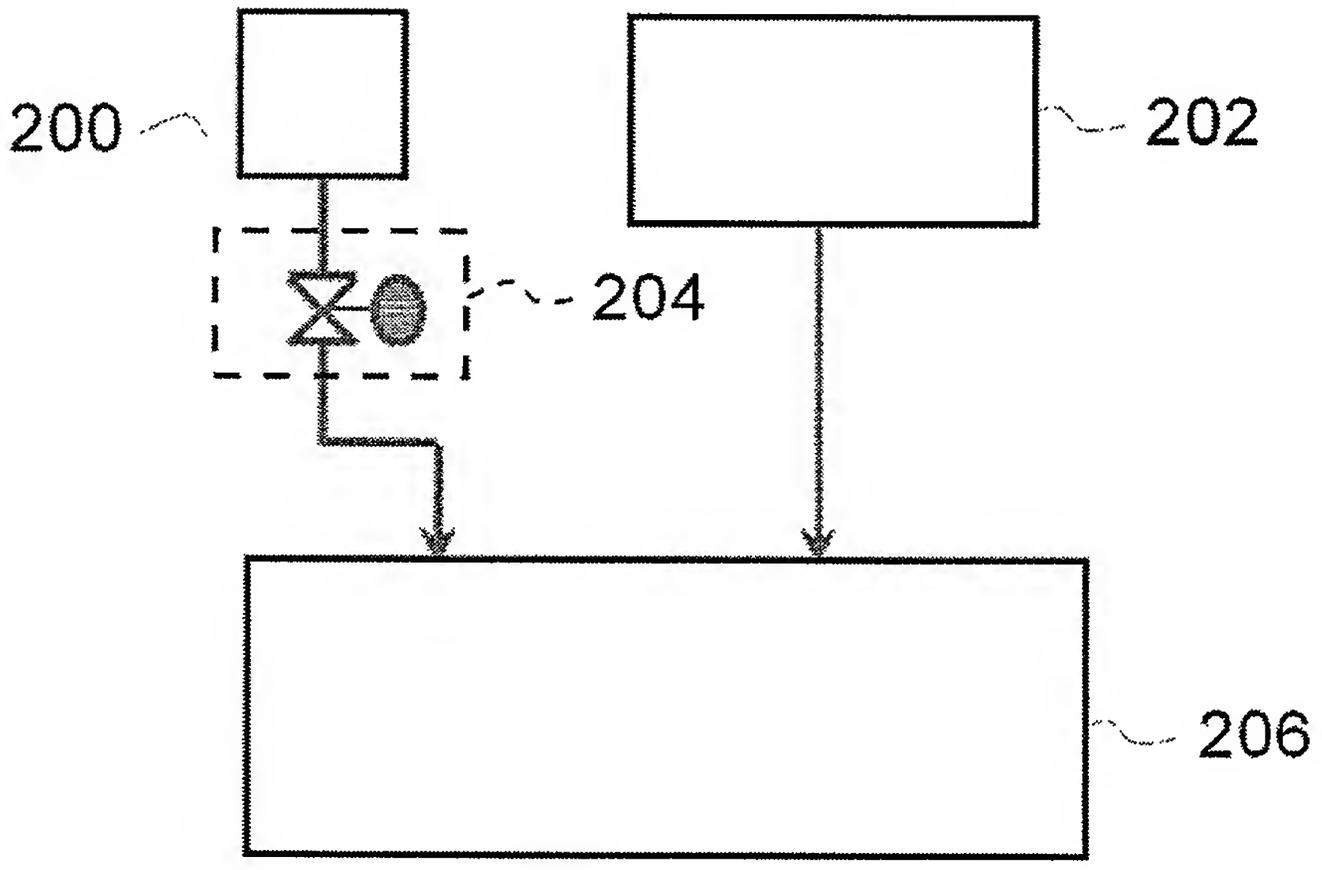

Fig.2a

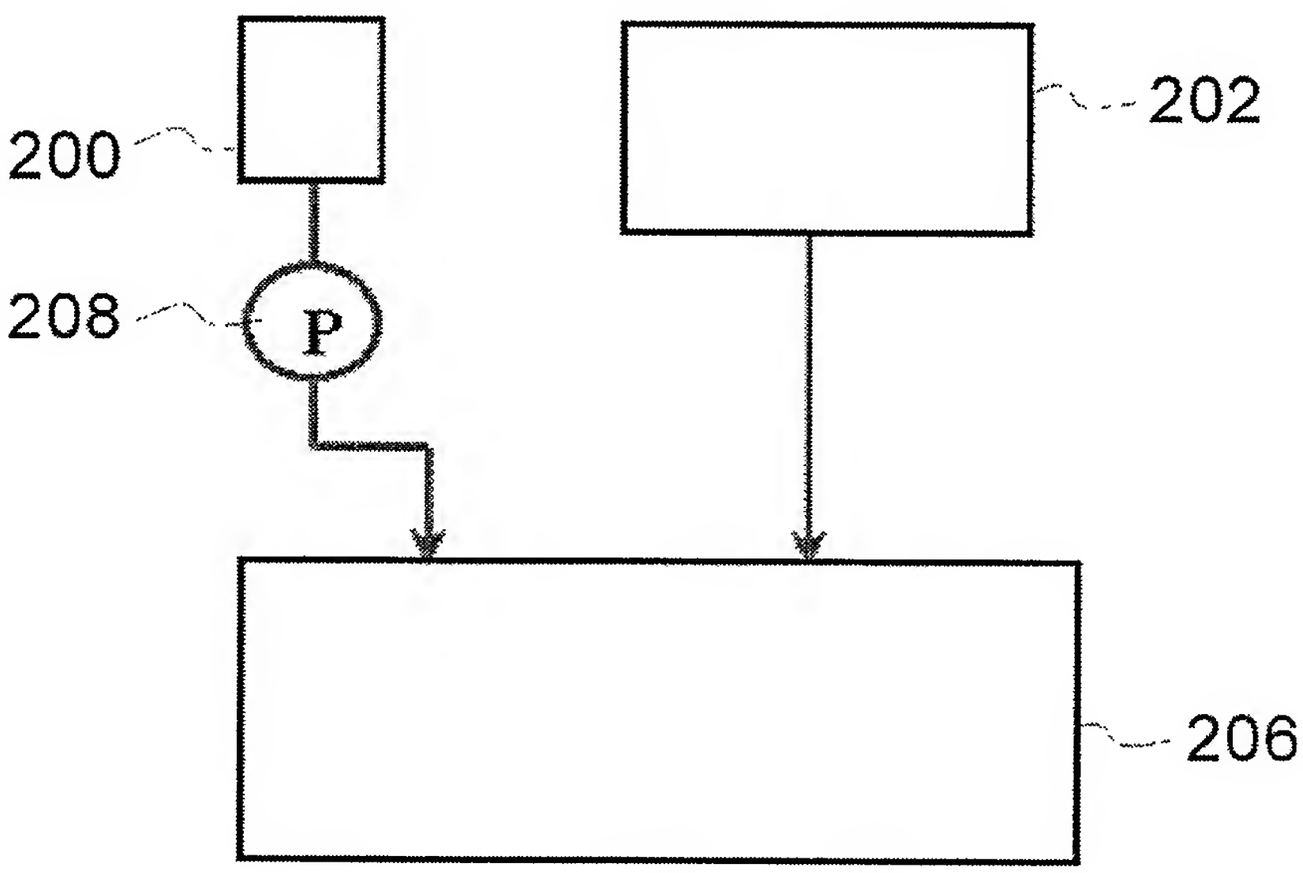

Fig.2b

	Settings	Description
HF spiking interval	60 Min	The interval of HF Spiking
Number of HF spiking	4 Times	The stroke count of a measuring pump used for HF spiking

Fig.3a

	Settings	Description
HF spiking interval	60 Min	The interval of HF Spiking
Number of HF spiking	3 Times	The stroke count of a measuring pump used for HF spiking

Fig.3b

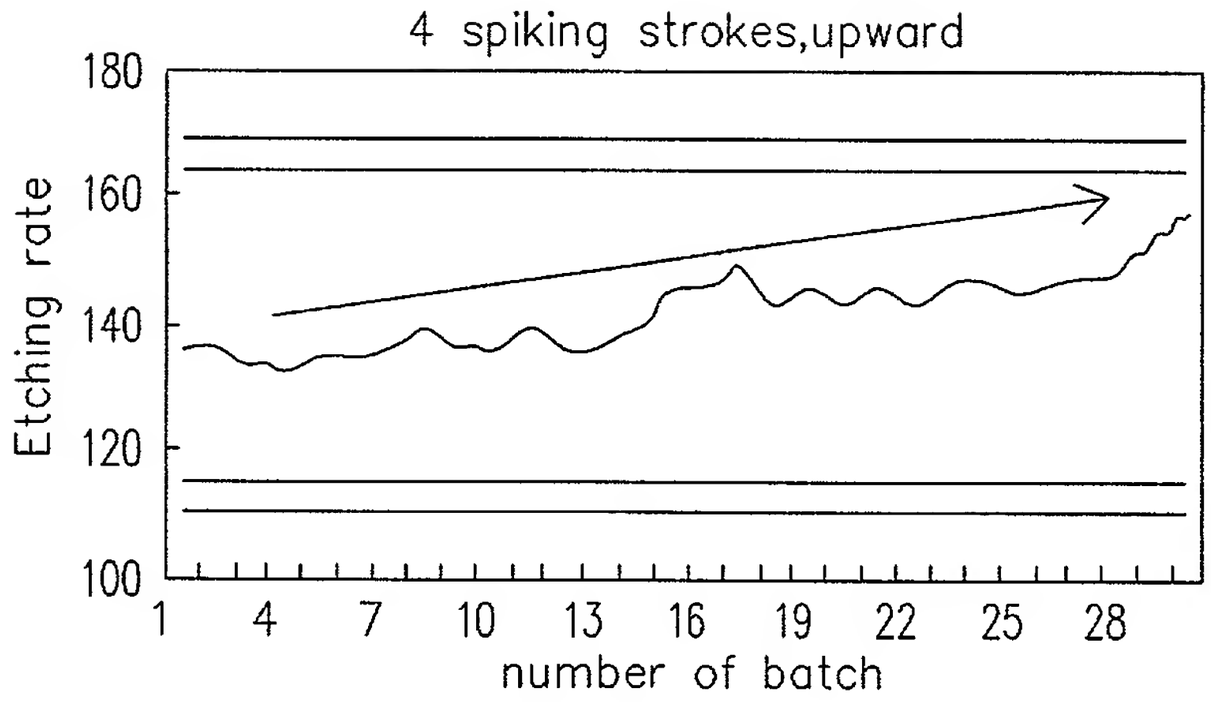
4 spiking strokes,upward
Etching rate
180
160
140
120
100
1
4
7
10
13
16
19
22
25
28
number of batch

FIG. 4a

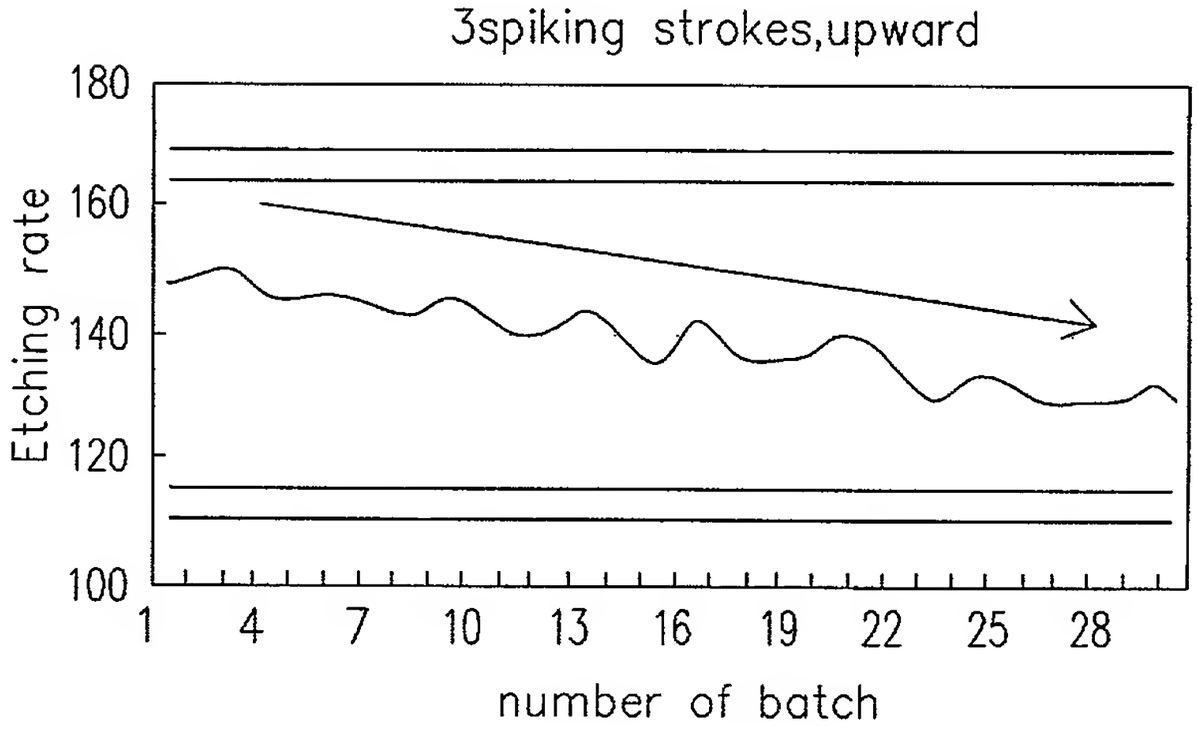
3spiking strokes,upward
Etching rate
180
160
140
120
100
1
4
7
10
13
16
19
22
25
28
number of batch

FIG. 4b

Result of etching before system running (280 sec.of etching time)		Target value : 140Å		Target value 440 Å	
Group	Etching amount of silicon nitride monitor wafer	Etching time(sec)	recipe	Etching time(sec)	recipe
Group 1	110-120Å	341	11	536	21
Group 2	120-130Å	314	12	493	22
Group 3	130-140Å	290	13	456	23
Group 4	140-150Å	270	14	425	24
Group 5	150-160Å	253	15	397	25
Group 6	160-170Å	238	16	373	26
Group 7	170-180Å	224	17	352	27

Fig.5a

Result of etching before system running (X sec.of etching time)		Target value . 140Å		Target value : 440 Å	
Group	Etching rate of silicon nitride monitor wafer(Å/sec)	Etching time(sec)	recipe	Etching time(sec)	recipe
Group 1	0 393-0 429	341	11	536	21
Group 2	0 429-0 464	314	12	493	22
Group 3	0.464-0.500	290	13	456	23
Group 4	0.500-0.536	270	14	425	24
Group 5	0 536-0 571	253	15	397	25
Group 6	0.571-0 607	238	16	373	26
Group 7	0.607-0 643	224	17	352	27

Fig.5b

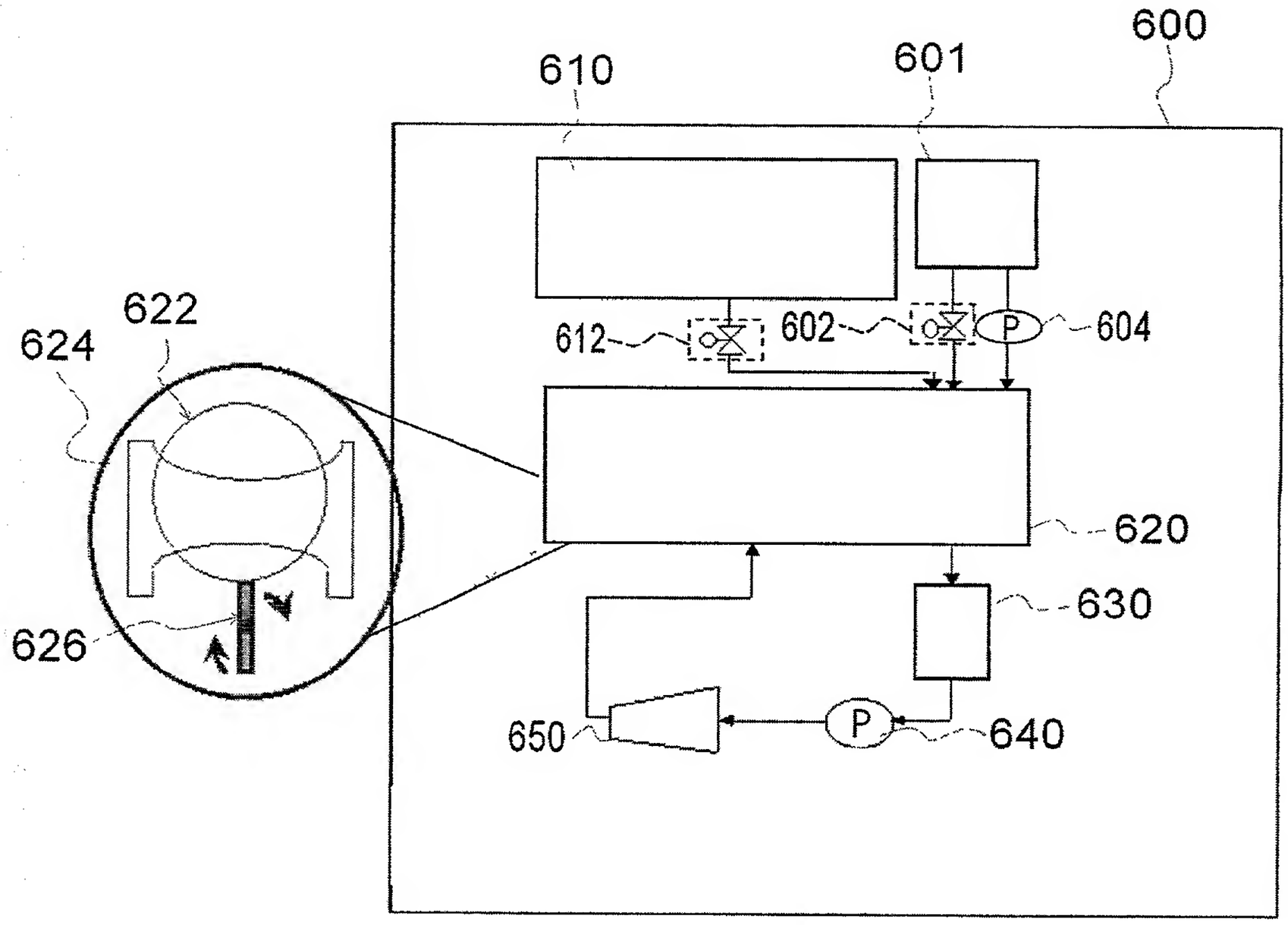

Fig.6

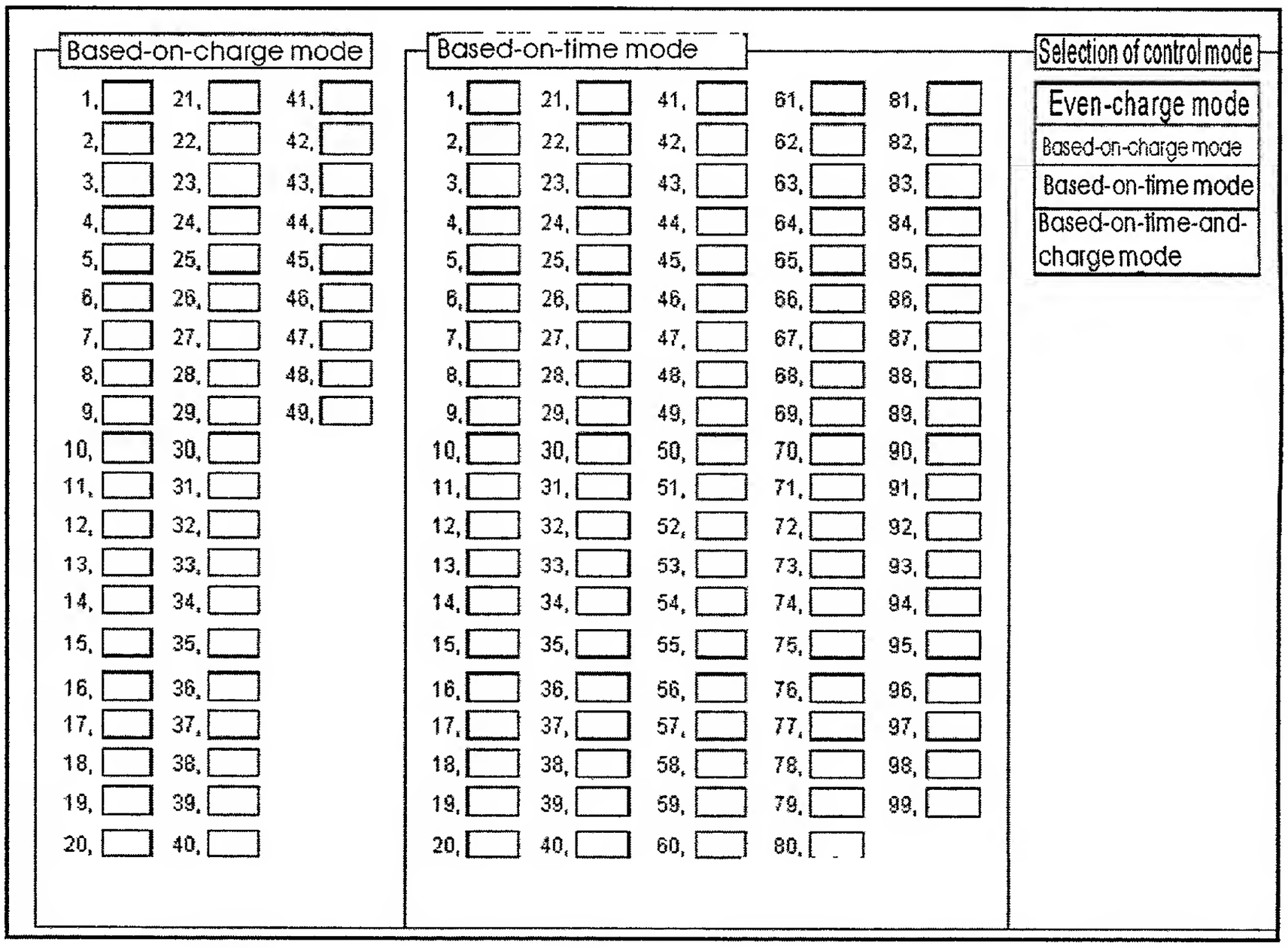
Based-on-charge mode
1, 21, 41,
2, 22, 42,
3, 23, 43,
4, 24, 44,
5, 25, 45,
6, 26, 46,
7, 27, 47,
8, 28, 48,
9, 29, 49,
10, 30,
11, 31,
12, 32,
13, 33,
14, 34,
15, 35,
16, 36,
17, 37,
18, 38,
19, 39,
20, 40,
Based-on-time mode
1, 21, 41, 61, 81,
2, 22, 42, 62, 82,
3, 23, 43, 63, 83,
4, 24, 44, 64, 84,
5, 25, 45, 65, 85,
6, 26, 46, 66, 86,
7, 27, 47, 67, 87,
8, 28, 48, 68, 88,
9, 29, 49, 69, 89,
10, 30, 50, 70, 90,
11, 31, 51, 71, 91,
12, 32, 52, 72, 92,
13, 33, 53, 73, 93,
14, 34, 54, 74, 94,
15, 35, 55, 75, 95,
16, 36, 56, 76, 96,
17, 37, 57, 77, 97,
18, 38, 58, 78, 98,
19, 39, 59, 79, 99,
20, 40, 60, 80,
Selection of control mode
Even-charge mode
Based-on-charge mode
Based-on-time mode
Based-on-time-and-charge mode

Fig.7

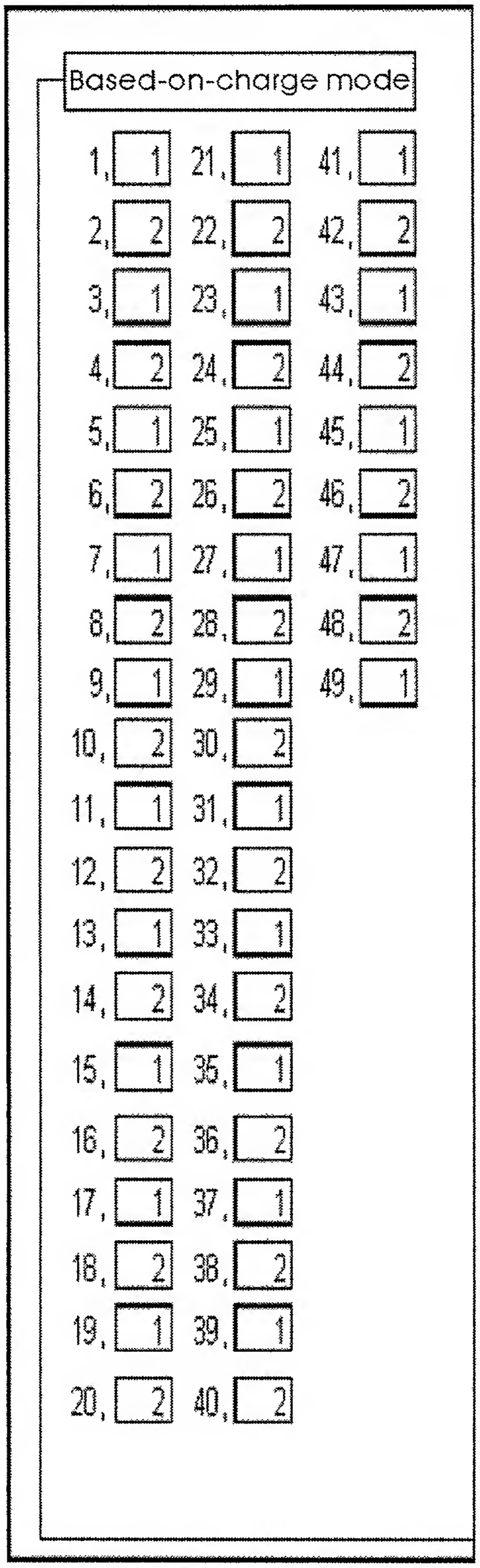
Based-on-charge mode
1, 1
2, 2
3, 1
4, 2
5, 1
6, 2
7, 1
8, 2
9, 1
10, 2
11, 1
12, 2
13, 1
14, 2
15, 1
16, 2
17, 1
18, 2
19, 1
20, 2
21, 1
22, 2
23, 1
24, 2
25, 1
26, 2
27, 1
28, 2
29, 1
30, 2
31, 1
32, 2
33, 1
34, 2
35, 1
36, 2
37, 1
38, 2
39, 1
40, 2
41, 1
42, 2
43, 1
44, 2
45, 1
46, 2
47, 1
48, 2
49, 1

Fig.8a

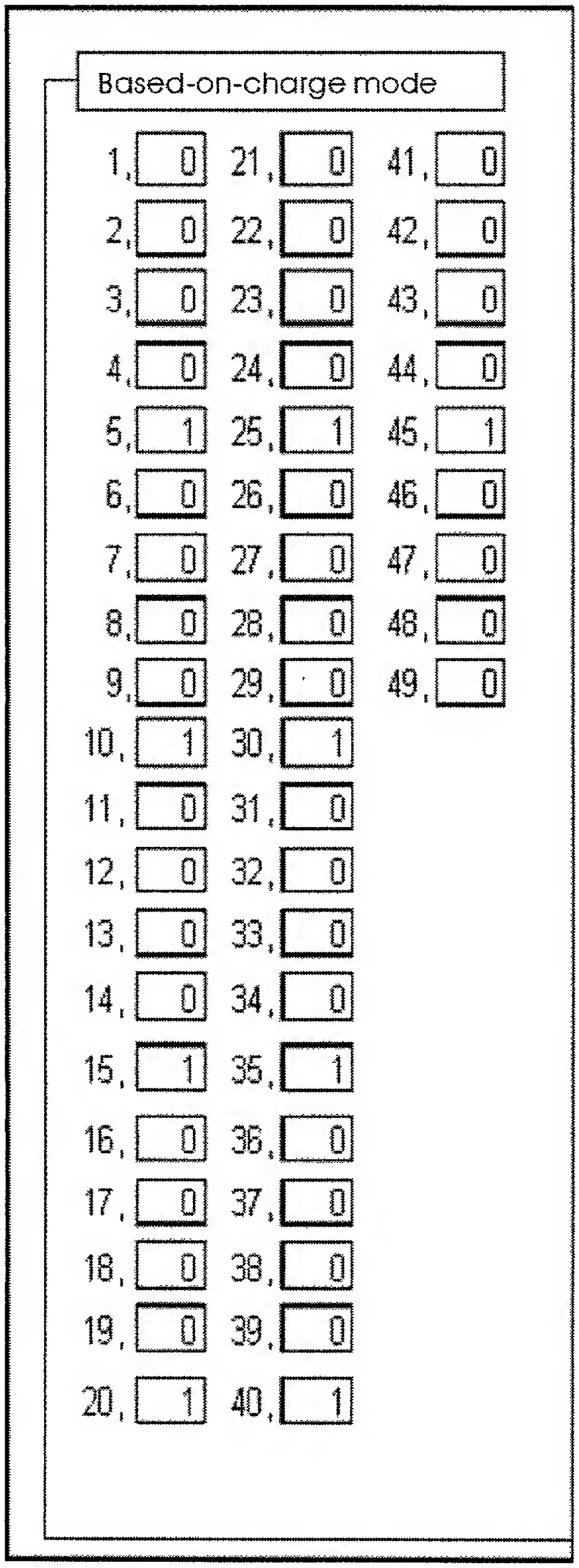
Based-on-charge mode
1, 0
2, 0
3, 0
4, 0
5, 1
6, 0
7, 0
8, 0
9, 0
10, 1
11, 0
12, 0
13, 0
14, 0
15, 1
16, 0
17, 0
18, 0
19, 0
20, 1
21, 0
22, 0
23, 0
24, 0
25, 1
26, 0
27, 0
28, 0
29, 0
30, 1
31, 0
32, 0
33, 0
34, 0
35, 1
36, 0
37, 0
38, 0
39, 0
40, 1
41, 0
42, 0
43, 0
44, 0
45, 1
46, 0
47, 0
48, 0
49, 0

Fig.8b

Based-on-time mode

1,	30	21,	3	41,	3	61,	4	81,	4
2,	5	22,	4	42,	3	62,	4	82,	4
3,	3	23,	3	43,	3	63,	3	83,	3
4,	4	24,	4	44,	4	64,	4	84,	4
5,	4	25,	4	45,	3	65,	4	85,	4
6,	4	26,	4	46,	4	66,	4	86,	4
7,	3	27,	3	47,	3	67,	3	87,	3
8,	4	28,	4	48,	4	68,	4	88,	4
9,	4	29,	4	49,	3	69,	4	89,	4
10,	4	30,	3	50,	4	70,	4	90,	4
11,	3	31,	3	51,	3	71,	3	91,	3
12,	4	32,	3	52,	4	72,	4	92,	4
13,	4	33,	3	53,	3	73,	4	93,	4
14,	4	34,	3	54,	4	74,	4	94,	4
15,	3	35,	3	55,	3	75,	3	95,	3
16,	4	36,	3	56,	4	76,	4	96,	4
17,	4	37,	3	57,	4	77,	4	97,	4
18,	4	38,	3	58,	4	78,	4	98,	4
19,	4	39,	3	59,	3	79,	3	99,	3
20,	4	40,	4	60,	4	80,	4		

Fig.9a

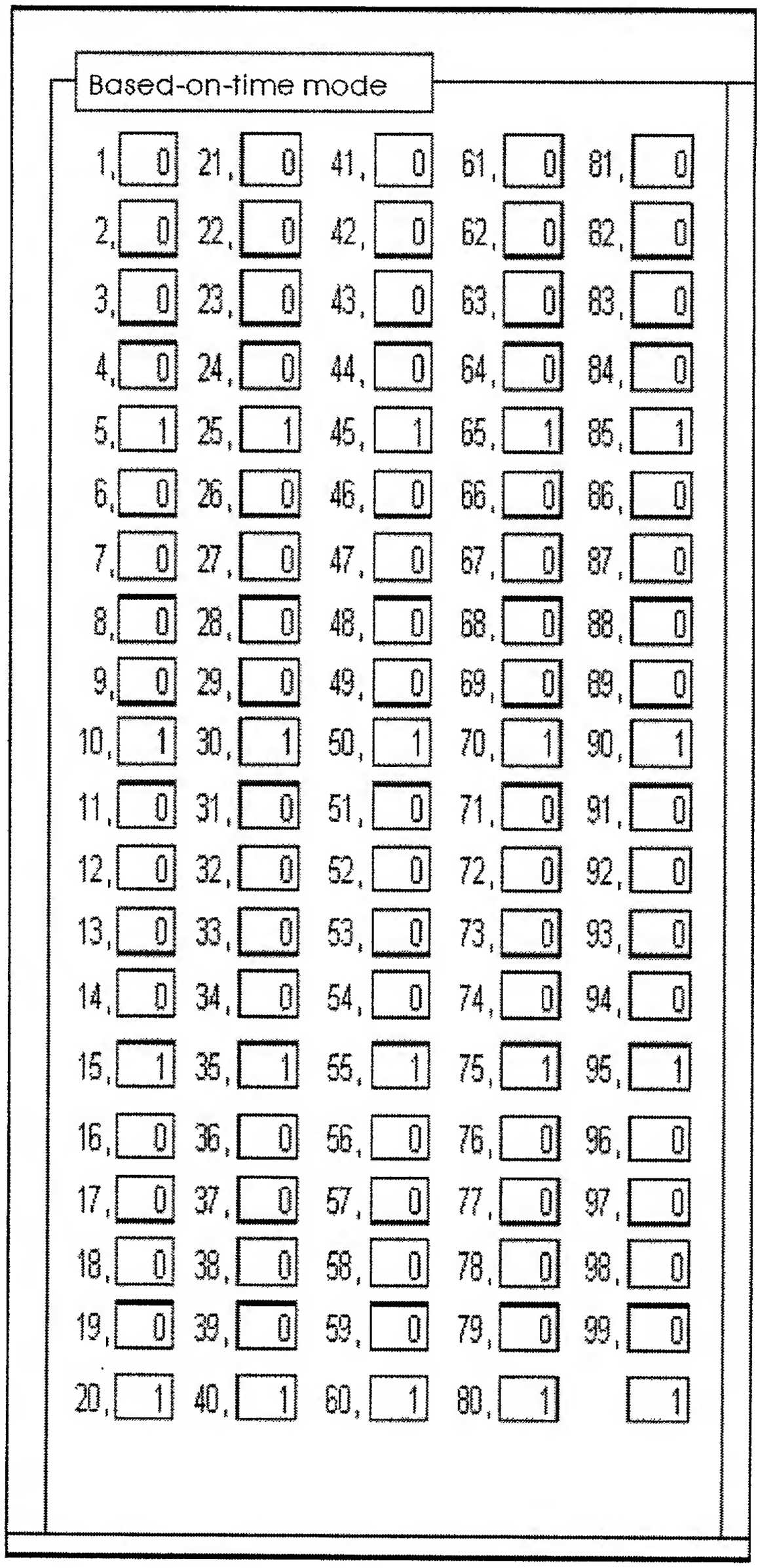
Based-on-time mode
1, 0 21, 0 41, 0 61, 0 81, 0
2, 0 22, 0 42, 0 62, 0 82, 0
3, 0 23, 0 43, 0 63, 0 83, 0
4, 0 24, 0 44, 0 64, 0 84, 0
5, 1 25, 1 45, 1 65, 1 85, 1
6, 0 26, 0 46, 0 66, 0 86, 0
7, 0 27, 0 47, 0 67, 0 87, 0
8, 0 28, 0 48, 0 68, 0 88, 0
9, 0 29, 0 49, 0 69, 0 89, 0
10, 1 30, 1 50, 1 70, 1 90, 1
11, 0 31, 0 51, 0 71, 0 91, 0
12, 0 32, 0 52, 0 72, 0 92, 0
13, 0 33, 0 53, 0 73, 0 93, 0
14, 0 34, 0 54, 0 74, 0 94, 0
15, 1 35, 1 55, 1 75, 1 95, 1
16, 0 36, 0 56, 0 76, 0 96, 0
17, 0 37, 0 57, 0 77, 0 97, 0
18, 0 38, 0 58, 0 78, 0 98, 0
19, 0 39, 0 59, 0 79, 0 99, 0
20, 1 40, 1 60, 1 80, 1 1

Fig.9b

Based-on-charge mode

1,	0	21,	0	41,	0				
2,	0	22,	0	42,	0				
3,	0	23,	0	43,	0				
4,	0	24,	0	44,	0				
5,	1	25,	1	45,	1				
6,	0	26,	0	46,	0				
7,	0	27,	0	47,	0				
8,	0	28,	0	48,	0				
9,	0	29,	0	49,	0				
10,	1	30,	1						
11,	0	31,	0						
12,	0	32,	0						
13,	0	33,	0						
14,	0	34,	0						
15,	1	35,	1						
16,	0	36,	0						
17,	0	37,	0						
18,	0	38,	0						
19,	0	39,	0						
20,	1	40,	1						

Based-on-time mode

1,	30	21,	3	41,	3	61,	4	81,	4
2,	5	22,	4	42,	3	62,	4	82,	4
3,	3	23,	3	43,	3	63,	3	83,	3
4,	4	24,	4	44,	4	64,	4	84,	4
5,	4	25,	4	45,	3	65,	4	85,	4
6,	4	26,	4	46,	4	66,	4	86,	4
7,	3	27,	3	47,	3	67,	3	87,	3
8,	4	28,	4	48,	4	68,	4	88,	4
9,	4	29,	4	49,	3	69,	4	89,	4
10,	4	30,	3	50,	4	70,	4	90,	4
11,	3	31,	3	51,	3	71,	3	91,	3
12,	4	32,	3	52,	4	72,	4	92,	4
13,	4	33,	3	53,	3	73,	4	93,	4
14,	4	34,	3	54,	4	74,	4	94,	4
15,	3	35,	3	55,	3	75,	3	95,	3
16,	4	36,	3	56,	4	76,	4	96,	4
17,	4	37,	3	57,	4	77,	4	97,	4
18,	4	38,	3	58,	4	78,	4	98,	4
19,	4	39,	3	59,	3	79,	3	99,	3
20,	4	40,	4	60,	4	80,	4		

Fig.10

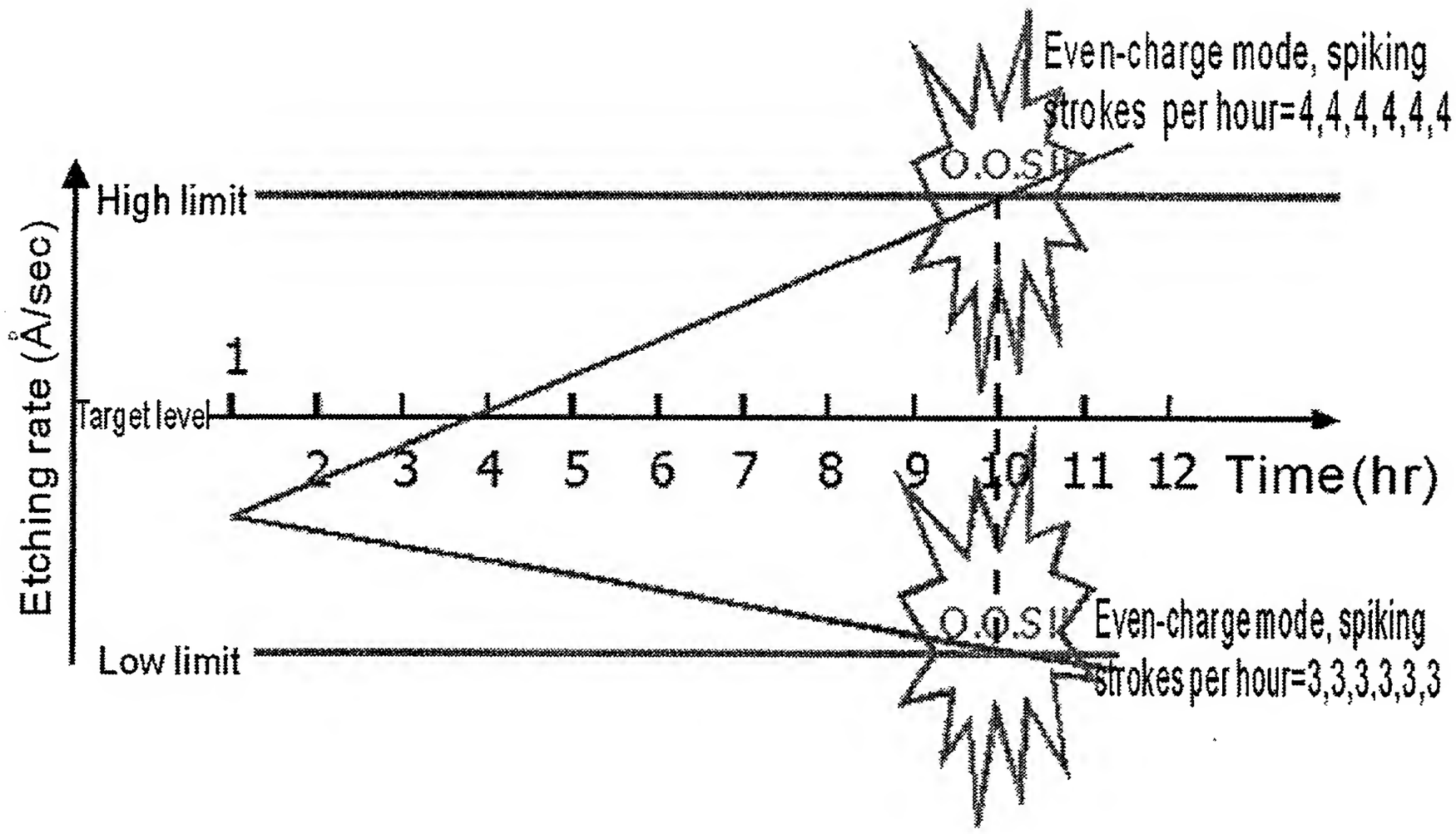
Even-charge mode, spiking
strokes per hour=4,4,4,4,4,4
O.O.S!
High limit
Etching rate (Å/sec)
1
Target level
2 3 4 5 6 7 8 9 10 11 12 Time(hr)
O.O.S!
Even-charge mode, spiking
strokes per hour=3,3,3,3,3,3
Low limit

Fig.11

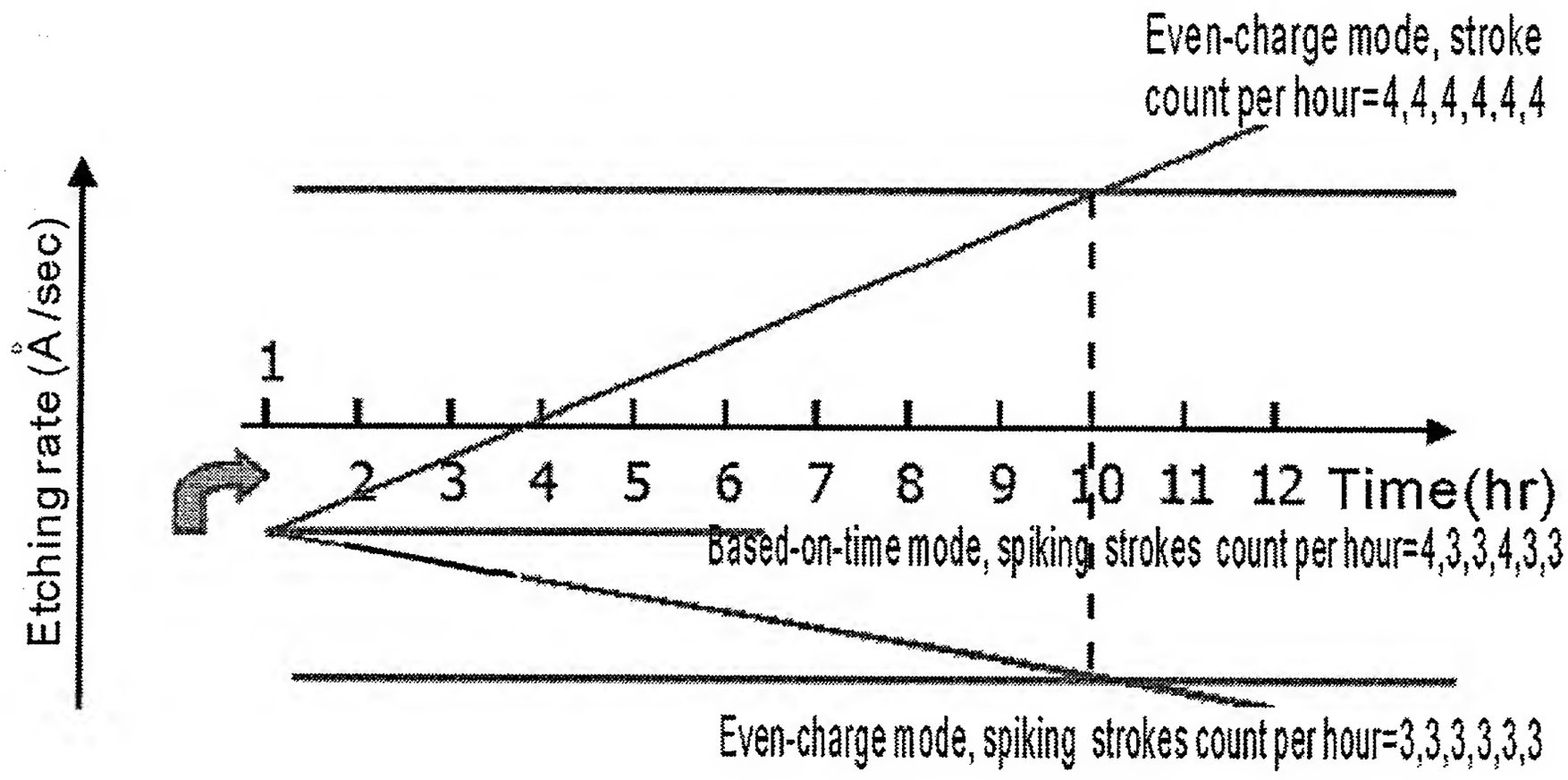
Even-charge mode, stroke
count per hour=4,4,4,4,4,4
Etching rate (Å/sec)
1
2 3 4 5 6 7 8 9 10 11 12 Time(hr)
Based-on-time mode, spiking strokes count per hour=4,3,3,4,3,3
Even-charge mode, spiking strokes count per hour=3,3,3,3,3,3

Fig.12

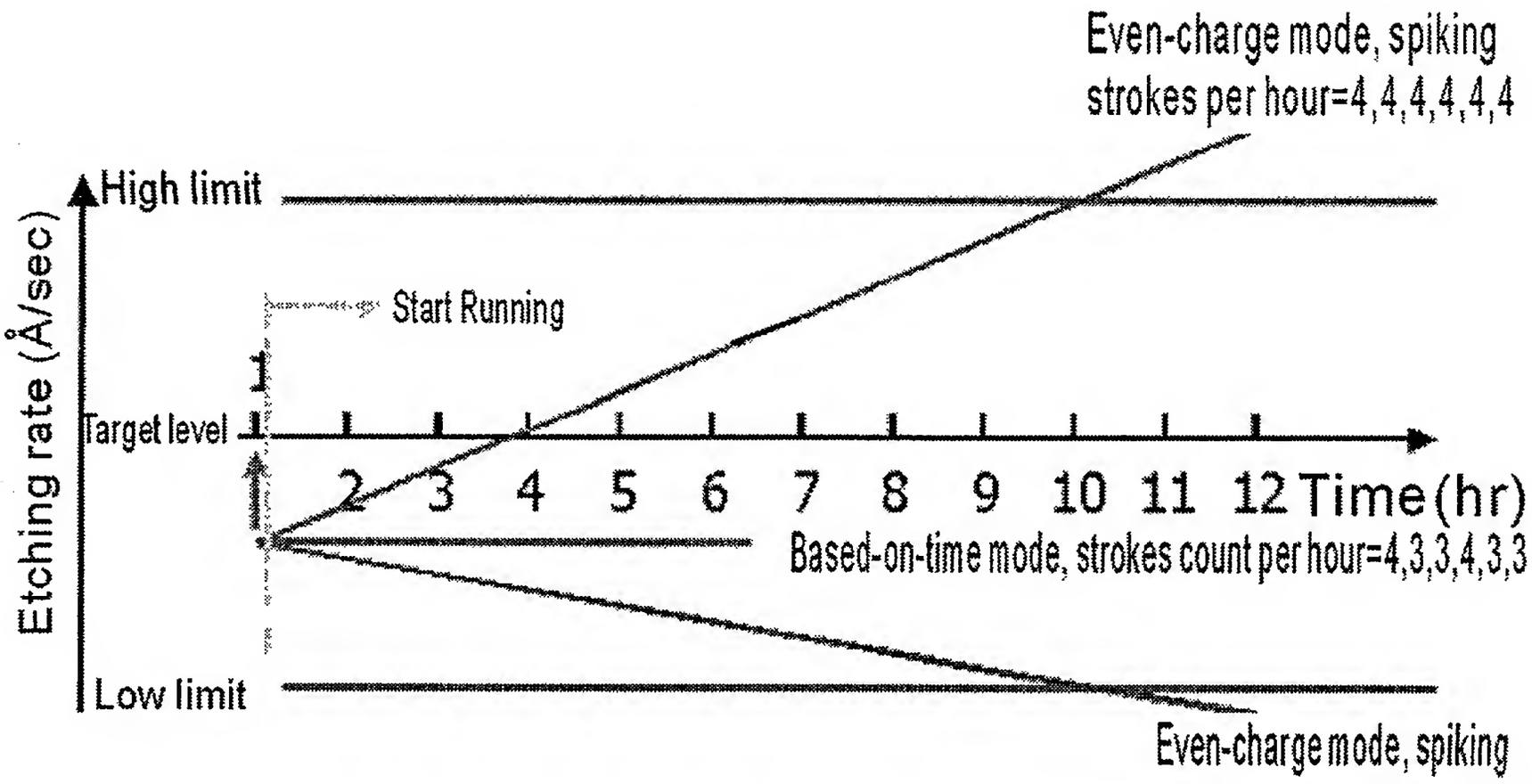
Even-charge mode, spiking
strokes per hour=4,4,4,4,4,4
High limit
Start Running
Target level
Etching rate (Å/sec)
1
2
3
4
5
6
7
8
9
10
11
12
Time(hr)
Based-on-time mode, strokes count per hour=4,3,3,4,3,3
Low limit
Even-charge mode, spiking
strokes per hour=3,3,3,3,3,3

Fig.13

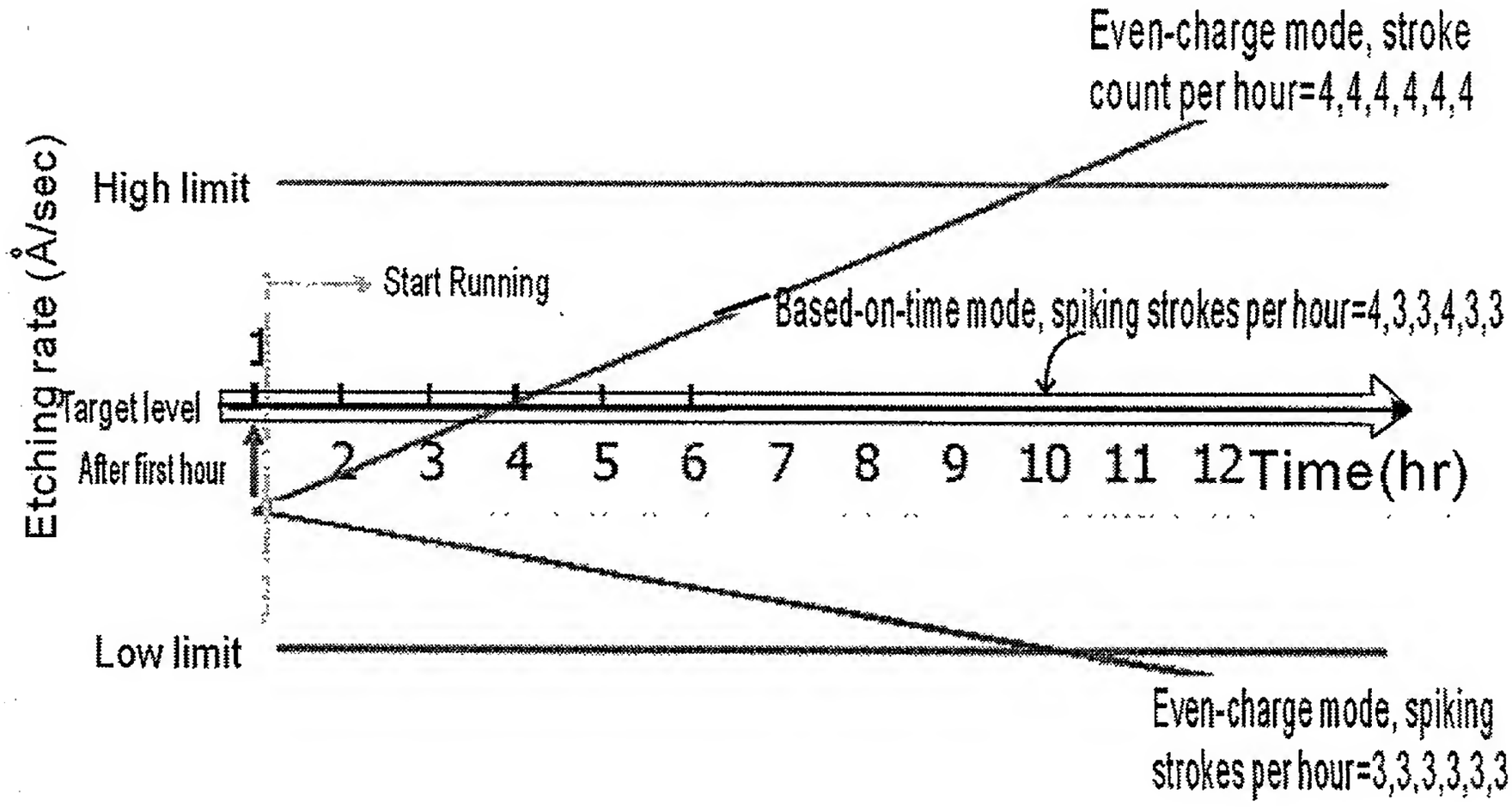
Even-charge mode, stroke
count per hour=4,4,4,4,4,4
High limit
Start Running
Based-on-time mode, spiking strokes per hour=4,3,3,4,3,3
Target level
After first hour
Etching rate (Å/sec)
1
2
3
4
5
6
7
8
9
10
11
12
Time(hr)
Low limit
Even-charge mode, spiking
strokes per hour=3,3,3,3,3,3

Fig.14